

JUN 07 2007

Remarks:

Reconsideration of the application, as amended herein, is respectfully requested.

Claims 1, 2 and 4 - 7 are presently pending in the application. Claims 1, 4 and 7 have been amended. Claim 3 was previously canceled.

Applicants gratefully acknowledge that item 6 of the above-identified Office Action indicated that claims 2 and 5 - 7 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In item 5 of the above-identified Office Action, claims 1 and 4 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U. S. Patent No. 6,509,621 to Nakao ("NAKAO").

Applicants respectfully traverse the above rejections, as applied to the amended claims.

More particularly, claim 1 has been amended to recite, among other limitations:

. . . the timings of the impression of both the respective word line current and the respective bit line current being exactly controlled so that the conventional switching of the magnetization direction

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of the soft magnetic layer of the selected memory cell is transferred into a magnetization rotation process rotating said magnetization direction of the soft magnetic layer in a plurality of successive angular displacement steps for incrementally rotating the magnetization direction of the soft-magnetic layer in a direction desired for writing a logic "0" or "1".  
[emphasis added by Applicants]

Similarly, Applicants' independent claim 4 has been amended to recite, among other limitations:

. . . said write circuit controlling the timings of the impression of both said respective word line current and said respective bit line current exactly causing the conventional switching of the soft magnetic layer of the selected memory cell to be transferred into a magnetization rotation process with only the soft magnetic layer of the respective memory cell being rotated in a plurality of successive angular displacement steps for incrementally rotating the magnetization direction of the soft-magnetic layer in a direction desired for writing a logic "0" or "1".  
[emphasis added by Applicants]

As such, all of Applicants' claims require, among other limitations, that the conventional switching of the soft magnetic layer of the selected memory cell being transferred into a magnetization rotation process with the soft magnetic layer of the respective memory cell being rotated in a plurality of successive angular displacement steps for incrementally rotating the magnetization direction of the soft-magnetic layer. The amendments to claims 1 and 4 are supported by the specification of the instant application, for example, by Figs. 3A - 3H and on page 12 of the instant application, line 10 - page 13, line 10, which states:

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In the graphical representations of Fig. 3A to Fig. 3H, which illustrate the temporal sequence of the rotation of the magnetization when writing a logic "1", for simplification the asteroid is omitted and only the easy axis is indicated by a dashed straight line. As in Figs. 2A-2E, the magnetization of the memory cell MTJ is represented by a bold black arrow and the magnetic field which is composed of the magnetic field components  $H_y$  and  $H_x$  and is induced by the word line current  $I_{WL}$  and the bit line current  $I_{BL}$  is represented by a doubly dashed arrow. Fig. 3A illustrates the initial situation, which corresponds to the initial situation illustrated in Fig. 2A. In Figs. 3B and 3C, a magnetic field  $H_y$  is first present only in the y-direction, in a manner induced by the currents  $I_{WL}$  and  $I_{BL}$ , which magnetic field first rotates the magnetization of the MRAM memory cell MTJ through an angle of between 0° and 90° (Fig. 3C). Then, if the two currents  $I_{WL}$  and  $I_{BL}$  flow, the magnetic field is generated with components  $H_x$  and  $H_y$  of approximately the same magnitude in the x-direction and y-direction, as a result of which the magnetization direction (bold arrow) rotates further and assumes an angle in the range between 90° and 180° (Fig. 3E). Finally, through a magnetic field which has a component  $H_x$  pointing only in the x-direction, the magnetization direction is rotated further in accordance with Figs. 3F and 3G until it is finally rotated in the x-direction (180°). Fig. 3H shows the de-energized end state, which specifies the information content in accordance with a logic "1" of the MRAM memory cell MTJ. [emphasis added by Applicants]

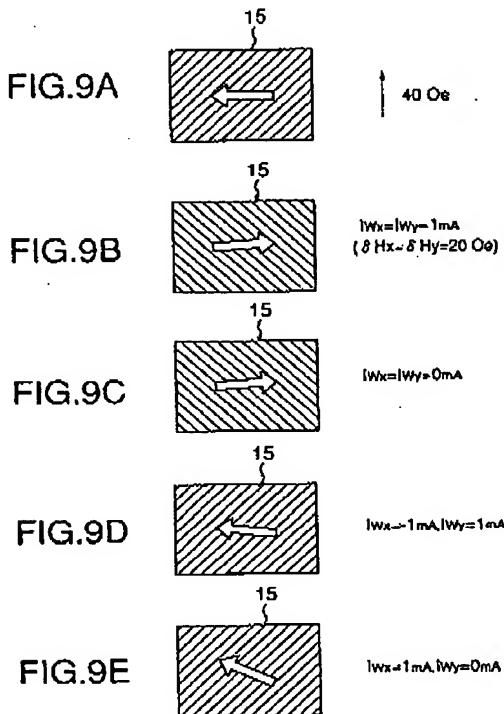
Contrary to the invention of Applicants' amended claims, the NAKAO reference fails to teach or suggest, among other limitations of Applicants' claims, the conventional switching of the soft magnetic layer of the selected memory cell being transferred into a magnetization rotation process with the soft magnetic layer of the respective memory cell being rotated in a plurality of successive angular displacement steps for incrementally rotating the magnetization direction

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of the soft-magnetic layer. More particularly, in response to Applicants' former argument (i.e., that the NAKAO reference failed to teach rotating the magnetization direction of the soft magnetic layer in a plurality of successive steps), pages 2 - 3 of the Office Action stated, in part:

. . . the Examiner directs applicant's attention to FIG. 9B - 9C and column 10, line 1. Column 10, line 1 reads: "Next in the step of Fig. 9D...", suggesting that rotating the magnetization direction is performed in a number of successive steps (i.e. FIG. 9B: step 1, FIG. 9C: step 2, and so forth), and not in a single step as argued by applicant.

Figs. 9A - 9E of NAKAO are reproduced herebelow, for convenience.



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NAKAO does not disclose, and Figs. 9A - 9E of NAKAO clearly do not show, the conventional switching of the soft magnetic layer of the selected memory cell being transferred into a magnetization rotation process with the soft magnetic layer of the respective memory cell being rotated in a plurality of successive angular displacement steps for incrementally rotating the magnetization direction of the soft-magnetic layer, as currently required by Applicants' claims.

It is accordingly believed that none of the references, whether taken alone or in any combination, teach or suggest the features of claims 1 and 4. Claims 1 and 4 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claims 1 or 4.

Finally, Applicants appreciatively acknowledge the Examiner's statement that claims 2 and 5 - 7 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In light of the above, Applicants respectfully believe that rewriting of claims 2 and 5 - 7 is unnecessary at this time.

In view of the foregoing, reconsideration and allowance of claims 1, 2 and 4 - 7 are solicited.

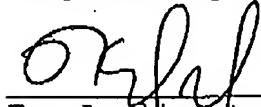
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In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,



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